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WMRC Overview

The world is changing at an ever-increasing rate. But there also are things that always remain the same. One of the most important of these is protecting the environment. And if you're running a business, another one is not wasting your money.

The Waste Management and Research Center has been providing assistance to Illinois businesses and the public since 1985. WMRC is a non-regulatory service organization affiliated with the University of Illinois and is a division of the Illinois Department of Natural Resources. WMRC has staff located in Champaign, Oak Brook, Peoria, Springfield, and Brighton.

Institutions both large and small are realizing that the environment and economic health are not competitors but are actually a great partnership. Recognition of this relationship is the key to success in the coming decades. Through WMRC's efforts, Illinois businesses can become more efficient and competitive. Improving the economic climate while protecting natural resources makes Illinois a better place to live, a role that WMRC has taken on since its beginning.

WMRC also has always had educational outreach as part of its mission. The Center will continue to find new ways to educate young and old alike about how science and nature can work together.

WMRC's staff is committed to providing real world solutions to real world problems.

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Waste Management and Research Center

Illinois Department of Natural Resources

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Governing Officials

State of Illinois

Rod Blagojevich, Governor

Department of Natural Resources

Joel Brunsvold, Director
Leslie Sgro, Deputy Director

Board of Natural Resources and Conservation

The BNRC is the governing body for the Illinois state scientific surveys, which includes the Waste Management and Research Center. The BNRC is an eight-member board appointed by the Governor and chaired by the Director of the Department of Natural Resources. It includes scientists, engineers, and representatives of the President of the University of Illinois and the President of Southern Illinois University.

Chairman
Joel Brunsvold, Director
Illinois Department of Natural Resources (IDNR)

Dr. Charles (Chip) Zukoski
Office of Vice Chancellor for Research
University of Illinois

Mr. John S. Mead, Director
Coal Research Center
Southern Illinois University

Ada C. Nielsen
Chemist
BP
Naperville, IL

Ms. P. Kay Whitlock, P.E.
Vice President of Christopher B. Burke Engineering, LTD
Rosemont, IL

Dr. John Ebinger
Professor Emeritus
Department of Biological Sciences
Eastern Illinois University

Dr. John Rogner
Field Supervisor
US Fish and Wildlife Service
Barrington, IL 60010

Geologist position vacant

Damon Stotts, BNRC Liaison
Acting Director, Office of Scientific Research and Analysis
IDNR

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Director's Message

Real world solutions

Real world solutions to real world problems. That's been a slogan at the Waste Management and Research Center (WMRC) for years, but what does it mean?

George Vander Velde, Director

It means that WMRC personnel provide years of experience to developing sensible solutions to our client's problems, developing and utilizing new and sophisticated technology, and providing advanced training. WMRC's client focused mission means that our staff gets involved in an amazing variety of issues.

Consider these projects:

- The "Mud to Park" project.
  Soil is clogging the Illinois River near Peoria and damaging the natural habitats. In Chicago, good soil is needed to cover an abandoned industrial area and give it a rebirth. So, let's take the soil out of the river and move it to where it is needed. A common sense solution, right! But it took WMRC's John Marlin to get all of the governmental agencies and private companies together to make the project a success. And now other parts of the country are looking toward the project as a way to solve some of their problems.
- Chemical Management Systems (CMS).
  Traditional chemical management supply relationships typically reward companies that make large purchases. Large businesses have been able to take advantage of innovative supply relationships, but smaller companies have not. That leaves these companies with costly stockpiles of chemicals that pose a potential safety risk. Small and medium size companies need to work together to manage chemicals and costs. A logical approach, but it took a project combining experts from WMRC and Illinois State University to make it work.
- Greening Schools.
  Children are our future, so they need to know more about the environment. Schools, unfortunately, often house chemicals that could harm our future leaders. So why not have a program that would help schools get rid of unwanted chemicals and help educators develop programs to teach about the environment and do as little harm to nature as possible. That idea is the keystone of the Greening Schools program that WMRC operates with the Illinois EPA.
- Lake Calumet Area Ecotoxicology Protocol.
  In order to determine the proper protection for ecosystems in the restoration and reconstruction in the Lake Calumet region, it is important to know the appropriate chemical constituent levels.

WMRC scientists have provided assistance in developing this protocol, but also have provided unique regional background chemical constituent data. These data are important to make the Ecotoxicology Protocol work.

These are but a few of the areas where WMRC tackles the issues that come up in the real world. If you are looking for a real world solution to an issue, give us a try.

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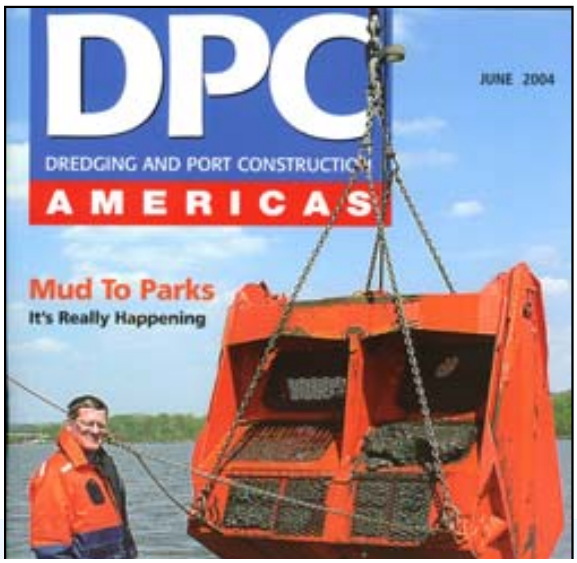
Mud to Parks

No project better demonstrates WMRC's commitment to real world solutions to real world problems than the "Mud to Parks" project.

The Illinois River provides commerce, recreation, and environmental habitat for a major portion of the state of Illinois. However, the river has been filling with sediment for the past century to the point that few areas outside the main channel are more than two feet deep. The result has been a significant decrease in recreational use and declines in fish and wildlife populations.

Meanwhile, there are areas that need quality soil to restore land that has been damaged or changed by mankind. So, why not take the soil from where it is not wanted and move it to places where it is desired. A common sense idea, but one that needed a variety of entities to work together to make it succeed.

The Waste Management and Research Center (WMRC) has been one of the leading agencies in this collaborative effort. John Marlin, Senior Scientist at WMRC, has spearheaded the project to remove sediment and mud from the Illinois River and redeposit it in areas where it will assist with revitalization. Illinois Lt. Governor Pat Quinn and Congressman Ray LaHood have both been strong advocates of this plan and have helped secure funding. The project involves a number of divisions of the Illinois Department of Natural Resources, the University of Illinois, the U.S. Army Corps of Engineers, and a variety of federal, state, and local organizations. Several private companies, such as ARTCO Fleeting and Midwest Foundation, also have been active in the project.



The "Mud to Parks" project has generated national recognition and value beyond Illinois during the past year. Articles about the project written by John Marlin have appeared in several international dredging magazines and in EWRI Currents (the newsletter of the Environmental & Water Resources Institute of the American Society of Civil Engineers). Marlin and the project was the subject of a cover story of the Dredging and Port Construction Americas edition. The Illinois Steward published a feature article on the "Mud to Parks" project in their Spring 2005 issue (written by John Marlin and Robert G. Darmody, professor, University of Illinois). There also have been news stories about the project in newspapers across the country and on the Internet.

It has taken a monumental effort to move the sediment, load barges with mud and pour it into restoration sites. Through the "Mud to Parks" project, more than 100,000 tons of sediment was dredged from Peoria Lake—a wide stretch of the Illinois River at Peoria. It was loaded onto barges and shipped 163 miles up the Illinois River to a former steel mill site in Chicago, now a slag-covered site devoid of soil. Upon arrival, it was spread atop the slag, covering 17 acres to a depth of 2-3 feet. Grasses has been planted and the rich, fertile sediment is turning into a green park on the shore of Lake Michigan. Some of the soil also was dredged and spread in a strip-mined area near Peoria.

This sediment is a huge resource that is basically out of place. Too often, people have treated soil an unlimited resource. Our rivers and lakes have filled with very rich Illinois farmland soils that have been eroded away transported by wind and rain to rest forever on our river bottoms.

Marlin estimates that in Peoria lakes alone there is enough sediment to cover a football field to a depth of 10 1/2 miles. This is a daunting number, but it is one that has caught the attention of numerous companies and agencies needing soil along waterways from Chicago to New Orleans.

Prior to the devastation caused by the 2005 hurricane season, John Marlin had already begun discussions with agencies located along the Gulf Coast. While the Illinois River has a surplus of mud, the marshlands located along the coastal area suffer from a deficit of sediment. The question being explored is: “Can Illinois River sediment be used to assist in the process of rejuvenating degraded marshes? The properties of Illinois River mud are similar to silt deposited on the Mississippi River delta and coastal marshes. These complimentary efforts of restoring marshlands and reinvigorating Illinois Rivers would combine to address a greater goal of improving the Mississippi River Continental Ecosystem and the Mississippi River Flyway.

John Marlin has met several times with various conservation groups in Louisiana, the U.S. Army Corp of Engineers (New Orleans District), the Coalition to Restore Coastal Louisiana, and The Louisiana Governors Office of Coastal Activities, to determine potential coastal applications of the “Mud to Parks” research. He presented at the U.S. EPA Region 6 workshop for “Large Scale Restoration Using Pipeline Conveyance of Dredged Material” and attended the Western Dredging Association Annual Conference.

Removal of enough sediment to restore even minimal amounts of aquatic habitat is a daunting effort. The sediment must be excavated from the water, placed in a transfer location, transferred by barge and re-deposited at a location often many miles away from the source. Illinois river sediment derives from some of the world’s best topsoil; it is rich in nutrients and organic matter. This makes it more valuable for restoration of brownfields, and ideally suited for marsh restoration.

"Mud to Parks" is a complex project. As this project continues to grow, WMRC's involvement with restoration efforts throughout the Mississippi River Continental Ecosystem will continue to expand. Check the **Illinois River Project webpage** on the WMRC web site for information.

Restoring the greatness of the Illinois River will enhance recreational and economic opportunities for Illinois citizens and it will help make the state more attractive to potential employers and their employees. It also it will improve the biological integrity and health of the Illinois River as part of the greater Mississippi River ecosystem.

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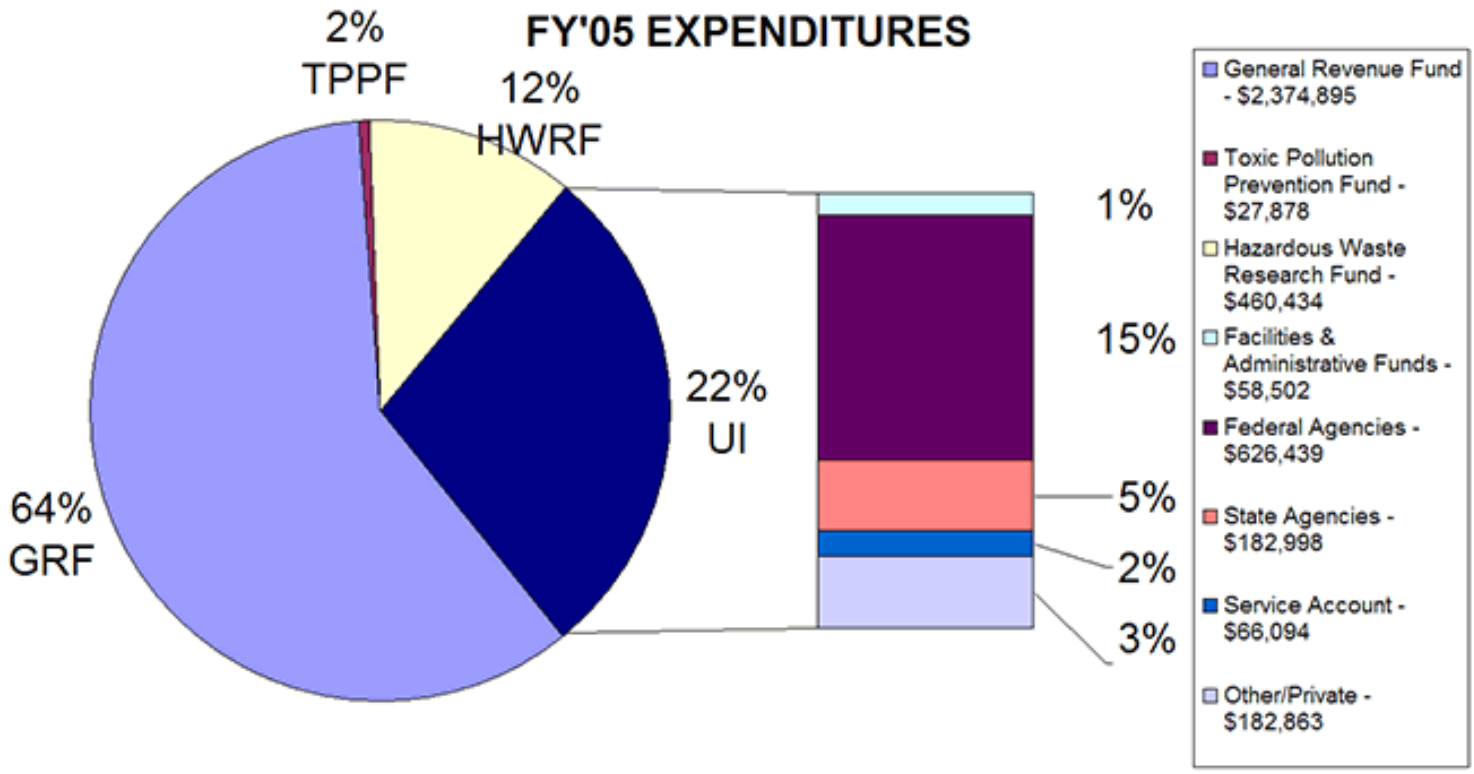
Where our Funding Comes From

The programs of Waste Management & Research Center are funded through a variety of sources. The largest source is General Revenue Funds from the state of Illinois. However, WMRC also receives funding from the University of Illinois, federal sources, other state sources, and private funds. The chart below shows the percentage of funding WMRC received in each category during Fiscal Year '05.



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ADOP2T

It's relatively easy for companies to hear about a new technology or process; the trick is getting them to adopt it. That is why the Waste Management & Research Center (WMRC) created the Accelerated Diffusion of Pollution Prevention Technologies (ADOP2T) model.

New technology and new ways of doing things can be intimidating. For new technology to be widely used, it must be tested, it must be available for review, and industry leaders must adopt it. The ADOP2T program establishes showcase demonstration sites in actual facilities. WMRC asks the industry to define its needs and what technologies or practices the industry would like to see explored. In exchange for participating, a facility receives WMRC assistance in setting up, testing, and evaluating a new technology. On site demonstrations, on-site technical assistance and testimonials from key industry leaders combine to show companies how they can have more efficient processes and a better fiscal bottom line.

WMRC continued to make innovative strides in the ADOP2T program during the past year. Some highlights included:

- A large Printed Wiring Board (PWB) facility has been working with WMRC on a water recycling using Reverse Osmosis. This project is almost complete, pending the analytical results of pilot test samples. This facility is also piloting Conductivity Control in a rinse bath on a plating line. The company has saved 50% on their water usage for just this one bath (412,000 gallons per year).
- A small PWB facility (less than 25 employees) has eliminated 100% of a hazardous waste stream that had been hauled off-site for disposal. The waste stream is now processed on-site which saves the company $20,000 per year.
- To advance the efficacy of WMRC's on-site technical assistance, two members of the Pollution Prevention Group are receiving energy audit training to become Certified Energy Managers. This will allow WMRC's assessment teams to do a complete Energy Efficiency/Pollution Prevention (E2/P2) assessment.

WMRC also is part of a three state ADOP2T initiative (Illinois, Kentucky, and Minnesota). This program leverages efforts to diffuse innovative technologies into targeted sectors (fiber reinforced plastics, coating & painting, printed wiring board, and metal finishing). For more information on ADOP2T, contact **Dr. Tim Lindsey**.

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Clean Air Counts

Improving air quality and enabling economic development in the six county region around Chicago is the goal of the Clean Air Countssm program. Waste Management & Research Center (WMRC), along with the Delta Institute, is spearheading efforts to work with the paint manufacturers in the Chicago area to reach this goal.

Clean Air Counts is a voluntary public-private initiative to reduce smog forming pollutants and energy consumption. WMRC and the Delta Institute are providing free technical assistance to participating companies to implement pollution prevention (P2) opportunities. WMRC provides laboratory testing, in-facility evaluation of processes, and technical expertise in developing alternative solvents. They also have produced a handbook for Chicagoland paint and coating manufacturers entitled “Selecting and Evaluating Cleaning Solvents.”

The Clean Air Counts program was one of a dozen honored nationally this year by the US EPA. The recognition came at the fifth annual Clean Air Excellence Awards ceremony in Washington, D.C. These awards honor outstanding, innovative efforts to make progress in achieving cleaner air.

In the past year, WMRC expanded its outreach service to paint manufacturers to promote successful P2 programs. These programs can include ways to reduce emissions, improve hazardous waste storage procedures, and reduce disposal costs for cleaning solvents. The Center also initiated direct technical assistance to high volume paint customers with strategies that reduce Volatile Organic Compounds (VOCs) associated with paint use and application. High volume users include bridge and water tower painting companies, manufacturers with large paint shops, municipalities, and commercial businesses.

Clean Air Counts is a collaborative effort of the Metropolitan Mayor Caucus, US EPA Region 5, City of Chicago, and Illinois EPA.

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GIS Services

The Waste Management & Research Center (WMRC) provides a valuable information service to the Department of Natural Resources (DNR) each year. The Center uses Geographic Information Systems, or GIS, to provide DNR with reports used for environmental assessment for the possible acquisition of land parcels. The reports include maps and tabular information on sites of environmental concern in proximity to properties that are of interest to DNR.

The land typically researched for purchase is a natural area, frequently adjacent to existing parks or other DNR-owned properties. This research is mandated, and also vital because it can limit environmental liabilities to DNR.

GIS also supports other WMRC projects by providing custom maps.

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2004 Governor's P2 Awards

Fifteen Illinois companies and organizations were declared winners of the 2004 Governor's Pollution Prevention Awards for significant achievements in helping the environment and the economy. This was the 18th consecutive year that the Waste Management & Research Center presented the awards.

"The award winners are leaders in their industries because of their ongoing commitment to the environment, their communities and their employees," Gov. Rod Blagojevich said. "Many of them have sustained pollution prevention programs over a number of years, striving to find new ways to reduce waste and show how pollution prevention is good for our economy and for retaining and creating jobs in Illinois."

"Again this year, we were impressed with the variety and quality of the projects undertaken by the award winning companies," said George Vander Velde, WMRC Director. "These businesses and organizations have proven that pollution prevention makes good sense for the environmental and economic health of Illinois. They have achieved their pollution prevention goals and saved millions of dollars in pollution control, waste disposal, energy and raw material costs."

The Pollution Prevention (P2) projects saved the honored companies and organizations millions of dollars in material and disposal costs. The companies and organizations also prevented hundreds of tons of waste materials from being released into the environment and saved millions of gallons of water from being sent to treatment facilities.

Applicants were judged in a statewide competition on criteria including technological innovation, environmental significance, economic benefits and commitment to pollution prevention. WMRC pollution prevention engineers reviewed the applications, while the Illinois Environmental Protection Agency determined company environmental compliance.

Information on the Governor's Pollution Prevention Awards program and technical assistance on pollution prevention are available from the Waste Management and Research Center, One Hazelwood Drive, Champaign, IL 61820, phone 217/333-8940, www.wmrc.uiuc.edu

2004 Governor's Pollution Prevention Award Winners

Large Industry Category
Behr Process Corporation in Chicago Heights
The Crown Cork & Seal USA, Inc. in Aurora
GM Electro-Motive in LaGrange
Cadbury Adams in Rockford

Educational Institution
Community Unit School District #3 (Cuba) Cuba School

Service Organization
Fermi National Accelerator Laboratory (Fermilab) in Batavia.

Continuous Improvement Award
International Truck & Engine Corp. in Melrose Park
Commonwealth Edison (ComEd) in Chicago
Nalco Company in Bedford Park
Sherwin Williams-Minwax in Flora
Caterpillar's Technology and Solutions Division in Peoria
Abbott Laboratories in Abbott Park
Caterpillar Cast Metals Organization (CMO) located in Mapleton
Maytag Herrin Laundry Products in Herrin
GE Healthcare Bio-sciences, located in Arlington Heights

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Greening Schools

Making schools healthier and improving the learning environment are the goals of the Greening Schools project. WMRC and the Illinois Environmental Protection Agency have combined efforts to assist schools with improving their physical environmental conditions, while also providing teachers standards-based tools to introduce the concepts of waste reduction and pollution prevention.

The Greening Schools project offers a Web site for teachers and school administrators (**www.greeningschools.org**). The content has been continuing updated during the past year and is responsive to requests and needs from educators. Fact sheets, checklists and standards-based lesson plans, book resources, curricula and activities related to waste reduction and pollution prevention are provided on the Web site.

Other project benefits for teachers and schools administrators include:

- Free on-site technical assistance to assess building conditions.
- On-line help desk to answer questions
- Listserv with a weekly mailing of timely, valuable resources
- Teachers can submit chemistry lessons for evaluation and WMRC chemists will offer suggestions on how the lesson can be changed to make the chemical less toxic
- Information on environmentally preferable purchasing

The project also offers Safe Chemical in Education workshops that address chemicals found in chemistry labs, biology labs, art rooms, industrial shops, and other areas. Workshop participants learn about the risks associated with out-of-date and improperly stored chemicals as well as how to reduce chemical volume and how to substitute the traditional chemicals with safer materials. Schools that participate in the Safe Chemical workshops are eligible for removal of educational waste chemicals at no cost. These workshops also introduce the principles of “green chemistry” to middle school and high school teachers, and show how they can be integrated into the classroom. Green chemistry is benign by design and helps to reduce the use or generation of hazardous materials.

Schools face a variety of health-related issues. While these differ from building to building, schools typically share some of the same constraints:

- Limited funding to address environmental conditions
- Rising costs of energy and maintenance of school building
- Lack of resources and technical assistance for teachers, administrators and staff

While hazardous materials are recognized issues, energy costs and indoor air quality also present real concerns for schools. Pest control and waste reduction and their associated costs have also become health and budget topics for school districts. WMRC's Greening Schools project is committed to assisting schools address these issues while providing the most current resources and high-quality technical assistance available at no cost. WMRC continues to build a strong network of support and resources across the state working to address the needs of individual schools and teachers.

Carol Knepp, WMRC's Education Specialist, also conducts in-class lessons for students. In this past year, she has introduced concepts of recycling and waste reduction for elementary students in ten schools and presented at regional and state events for educators. Three new Greening Schools teacher/ administrator workshops under development for 2006 are Integrated Pest Management in Schools, Healthy Art Classrooms, and Sustainable Schools. Greening Schools will continue to visit schools and to assist teachers and students identify more sustainable practices and lifestyles.

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Information Sharing Projects

WMRC is a national and regional leader in developing advanced information tools for environmental applications. WMRC coordinates two federally funded projects that provide decision-making resources to customers across the nation. The Center also is part of a national network about pollution prevention.

P2Rx and GLRPPR

The **Pollution Prevention Resource Exchange (P2Rx™)** is a consortium of eight regional pollution prevention information centers, funded in part by the EPA. These centers all provide pollution prevention information, networking opportunities and other services to states, local governments and technical assistance providers in their region. U.S. EPA awarded WMRC funding to support the Pollution Prevention Resource Exchange (P2Rx) for the sixth year in a row.

The Midwest P2Rx center is known as the **Great Lakes Regional Pollution Prevention Roundtable (GLRPPR)**. This organization is coordinated by WMRC. Through its participation in P2Rx, the Roundtable is able to expand the services and products provided to the entire Great Lakes Region as well as provide quality and cost-effective national products.

Topic Hubs are web-based guides to peer-reviewed pollution prevention information and expertise on a particular subject. GLRPPR has developed eight of the Sixty-two Hubs offered by P2Rx. During the past year, GLRPPR developed the P2 & Environmental Security, the Technology Diffusion, and the Great Lakes Regional Salvage Yard topic hubs. These hubs can be accessed at **www.glrppr.org/hubs**. GLRPPR also continues to expand and improve topic hubs that it previously developed, which include:

- **Regulatory Integration**
- **Mercury In Schools**
- **Mercury In Healthcare**
- **Lithographic Printing**
- **Flexographic Printing**
- **Technology Diffusion**
- **P2 & Environmental Security**
- **Great Lakes Regional Salvage Yards**

U.S. EPA also awarded WMRC funding to support the operation of GLRPPR for the 10th year in a row. This year, GLRPPR helped plan and promote the international Envirotech Expo held in Chicago. GLRPPR

Executive Director Deb Jacobson served on the Envirotech Technical Program planning committee. All Envirotech promotional literature included GLRPPR as a sponsor of the week-long program.

GLRPPR also hosted a half day program at McCormick Place in Chicago in March, which was attended by 35 people. Program topics included "Sustainability Measurement in Paper Manufacturing," "Light Resin Transfer Molding Technology," "Evaluation of Low Cost Chairside Amalgam Separation Systems," and "The Impact of Used Electronics on the Waste Stream and U.S. EPA's Electronic Waste Initiatives E." GLRPPR staff also spent a large amount of time this year coordinating with the New York steering committee members to plan the Summer 2005 conference at the New York Academy of Science in New York City.

PNEAC

The **Printers' National Environmental Assistance Center (PNEAC)** is one of the national compliance assistance centers established by U.S. EPA Office of Enforcement and Compliance Assurance. WMRC has received funding from the U.S. EPA to coordinate PNEAC since 1995. PNEAC maintains services to industry and government agency staff including

- on-line, direct technical and compliance assistance to printers;
- a comprehensive web site that provides environmental compliance, safety and technical resources specific to the commercial printing industry.

Fact sheets and case studies continue to be a key resource available on the PNEAC web site. Over the last year, the Universal Waste fact sheet was updated to reflect changes in the federal Universal Waste regulations. New fact sheets were added to the web page including PCB and DEHP in Lighting Ballasts, EPA Toxic Release Inventory (TRI) Compliance at Printing Facilities, EPCRA Reporting Requirements for Printers, and TRI/HAP Chemical List for Printers written by Debra Jacobson. Other fact sheets written by subcontractors to WMRC for this project published MACT Standard for Boilers & Process Heaters fact sheet, Computer-to-Plate (CtP) Systems and Environmental Compliance, VOC/HAP Emissions from Sheetfed Offset Printing. These fact sheets and other resources maintained by WMRC staff and project subcontractors can be accessed at **www.pneac.org**.

PNEAC served as a co-sponsor of the Printers National Environmental Health & Safety Conference held in Tampa, Florida in March 2005. PNEAC has co-sponsored the program for ten years.

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Waste Management and Research Center

Illinois Department of Natural Resources

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WMRC 2005 ANNUAL REPORT

Laboratory Services

The WMRC Laboratory staff seeks solutions to environmental problems posed by research scientists, businesses, and educators. During Fiscal Year 05, WMRC served 58 different clients from industry, state government, the public, and the Illinois university research community. The Lab issued 282 laboratory data reports, having analyzed 27,174 constituents in 4,068 distinct samples.

Equipment funding was limited during the fiscal year, but the laboratory services group was able to replace its sterilizer system that was original equipment when the WMRC headquarters building opened in 1990. In addition, the group solicited some funding from the Illinois Terrorism Task Force (ITTF) to assist with the maintenance of the research grade gas chromatograph-mass spectrometer (GC/MS) purchased in FY04.

Revitalizing the Lake Calumet region

The Lake Calumet area in Chicago is a site of former landfills and abandoned industrial facilities. The Illinois Department of Natural Resources funded a study at the Illinois Waste Management and Research Center and the Illinois State Water Survey to investigate background concentrations of toxic environmental contaminants in the south Chicago area. The study, funded through the Environmental Protection Trust Fund, was undertaken to provide background information on environmental contaminants in support of Chicago Department of Environment's efforts to revitalize wetlands in the Calumet region of South Chicago.

An important component of the revitalization effort is defining ecotoxicological risks in these environments. Criteria to minimize such risks were developed by the Calumet Ecotoxicology Protocol Technical Team. Surface water and sediment background concentrations for the region's wetlands were identified as lacking. Eight ponds and lakes were sampled for surface waters and sediments. The samples were analyzed for a variety of toxic metal and organic constituents as well as a number of major constituents and other system properties.

Heron study

Sample analysis for the WMRC funded Black-Crowned Night Heron study in the Lake Calumet region has been completed. A total of 196 samples were analyzed at the WMRC laboratory. The organic contaminant list included 27 polychlorinated biphenyl congeners (PCBs), 11 organochlorine pesticides (OCs) and metabolites, and 15

polynuclear aromatic hydrocarbons (PAHs). Samples included 93 fish samples, 59 embryo samples, 24 chick regurgitate samples and 20 crayfish samples. Samples representative of the typical prey the herons were eating and feeding to the young were collected by electroshocking in areas where the herons were observed to forage. The embryo samples were collected from three different locations -- the Calumet black-crowned night heron colony, a colony in Virginia, and a colony in Minnesota. Regurgitate samples were collected from the nesting colony, and consisted mainly of alewives.

Photo courtesy of the Illinois Natural History Survey

Calumet area fish samples showed elevated levels of polychlorinated biphenyls (PCBs). The concentrations varied depending on the location in which they were collected and the species. In particular, the bottom-feeding minnows had some of the highest levels. WMRC-generated PCB congener profiles allowed researchers to show that alewives collected from a sampling site on Lake Michigan were the same as those in regurgitate samples collected from the young herons. A number of the samples showed high levels of chlorinated pesticides and metabolites, especially DDE. Heron embryos in the Calumet region showed substantially higher levels of the PCBs and pesticides than did embryos collected in other regions of the country.

Investigating Coal Ash Leachate for the Power Generation Industry

Arsenic and selenium can exist in the environment in numerous toxic chemical forms. It is important to understand the sources of environmental contamination by these elements so that the appropriate remediation actions can be taken to mitigate it. One suspected source of such contamination is the collection of huge settling ponds of coal ash associated with the electric power generation industry. Rainwater may filter through the ponds and leach trace levels of arsenic and selenium from the ash into the groundwater.

WMRC Senior Analytical Chemist Jonathan Talbott is collaborating with several researchers from private industry and the Energy Power Research Institute (EPRI) to investigate characteristics of coal ash, such as its mineral structure and chemical composition, that affect the mobility of arsenic and selenium originating from the ash. In an effort to determine what factors have the greatest influence on the solubility of arsenic and selenium from coal ash, the researchers are evaluating:

- characteristics of the leachate, such as its pH;
- the forms of arsenic and selenium leached;
- the solubility of other elements;
- the physical and chemical characteristics of the original coal itself;
- the coal source; weathering conditions;
- operating conditions at the power plant during coal combustion.

Education outreach

The WMRC Laboratory continued its long-standing tradition of providing training to Chemistry students at Parkland Community College. Parkland students receive training in both organic and inorganic chemistry. The students tour the WMRC labs, receive short lectures on procedures at equipment, and receive demonstrations on the analysis of samples. This association between WMRC and Parkland chemistry students goes back almost 10 years.

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WMRC 2005 Annual Report

Library and Clearinghouse

The Library and Clearinghouse at Waste Management & Research Center (WMRC) specializes in the science of waste management, which makes it a resource that is unique in the nation. The Library's print collection includes industry case studies and information on pollution prevention practices, environmental education, sustainable development, environmental and analytical chemistry, and household hazardous waste. The Library's holdings include thousands of books, articles, maps, reports, and periodicals.

In FY 2005, the Library's staff began to collect more materials in the areas of energy efficiency and alternative energy to support WMRC's increasing efforts in this area.

The Library's staff continues to add holdings to OCLC, a national shared bibliographic database, making the collection available for loan to libraries throughout the country. The Library's periodical holdings have been in OCLC since the 1990s. The Library has also continued to partner with twenty other libraries from the Lincoln Trail Libraries System in a Questionpoint cooperative profile. The "MyLibrarian" virtual reference service went online in August 2003. It is available through the **WMRC Library's Web** site or at **http://www.mylibrarian.info/**. In FY 2005, the service expanded to include libraries from the Lewis & Clark and Shawnee Library Systems.

Last year, the WMRC Library staff responded to over 300 information requests from clients. In addition, library staff added 359 books and videos, 16 serials, and 870 articles to the library's collection. The Library staff also continued to add records for Web sites and online documents to the library's catalog.

The WMRC Library added several new reference guides to its web site in FY 2005. Topics of the new guides include:

- Alternative fuels
- Earth Day
- Environmental laws and regulatory resources
- Household chemicals and alternatives
- P2 in the Food Service Industry
- Sustainable product design

Click here to view all of the reference guides.

In August 2004, WMRC Library staff began an environmental news web log to update Center staff on environmental news and emerging issues. Environmental News Bits is available at **http://radio.**

weblogs.com/0141565/.

The Clearinghouse consists of reports from research projects funded by the Center, pollution prevention fact sheets and brochures, and other environmental information from around the world. The Clearinghouse distributed 1,217 publications last year on topics ranging from household hazardous waste to mercury and pollution prevention in schools. In FY 2005, the Center moved to electronic-only distribution of its research reports. During the year, 19,191 WMRC reports and fact sheets were viewed on the web site, an increase of 6,500 views from FY 2004.

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Materials & Energy Efficiency for SMEs

Small to medium size companies are not able to achieve some of the same economic advantages that large companies enjoy. But that may change under a program being developed by the Illinois Waste Management and Research Center (WMRC), Illinois State University, and the Illinois Manufacturing Extension Center.

This pilot program helps small and medium enterprises (SMEs) improve materials and energy efficiency in their manufacturing process. Large businesses have taken advantage of innovative supply-chain relationships to save money. Innovative supply-chain programs like Chemical Management Services (CMS) and Energy Performance Contracting (EPC) reward suppliers for finding ways to improve materials and energy efficiency. Typically, such programs have not worked with SMEs because the annual spending on any one material or energy source is not large enough to cover the supplier's research and implementations costs.

This new project's research has explored the possibility of making such programs available to SMEs by combining several materials and energy sources into a single program. This would allow SMEs to achieve the same cost savings enjoyed by large companies. Specifically, the project has examined opportunities in the metalworking industry in areas generally considered to be outside the area of expertise of metalworking SMEs: chemicals, tooling, paint, energy, and waste management. The research suggests that the combined annual spending in these areas exceeds $1 million for many metalworking SMEs.

In one successful pilot program, an SME combined tooling and metalworking fluids in a program that used incentives to involve suppliers in improving plant efficiency and reducing costs. The company is currently exploring the addition of electricity to the program. Other plants participating in this research are exploring similar programs, or programs combining paint, cleaning chemicals, and natural gas.

The research suggests that sufficient economies of scale are available in metalworking SMEs to make incentive-based supply chain programs successful. The most significant barrier appears to be a lack of suppliers capable of taking advantage of this opportunity. Since a single supplier does not possess expertise in all the critical areas (such as tooling, metalworking fluids, and electricity management), suppliers with different expertise must establish cooperative relationships. Ongoing research is needed to support pilot projects that demonstrate not only the financial and environmental benefit to SMEs, but also the profitable returns available to suppliers who find ways of combining their expertise through innovative partnerships.

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WMRC 2005 ANNUAL REPORT

Publications and Presentations

Informing the public about the many interesting and important projects at Waste Management & Research Center (WMRC) is an on-going commitment. WMRC staff members had a number of publications and poster presentations during the year.

Publications

Barnes, L.L. (2005). Celebrate Earth Day! *ERMD News* Spring 2005, 15.

Barnes, L.L. (2005). **Selected Alternative Fuels Resources**. *ERMD News* Spring 2005, 8-10.

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Chow, T.; Wilcoxon, M.; Piwoni, M.D.; Adrian, N. "Trace Level Analysis of RDX and its Biodegradation Intermediates in Liquid Media by Solid-Phase Extraction and High-Pressure Liquid Chromatography Analysis." *Journal of Chromatographic Science* 42(9), 470-473, 2004.

Darmody, R. G., J. C. Marlin, J. Talbott, R. A. Green, E. F. Brewer, and C. Stohr. 2004. Dredged Illinois River Sediments: Plant Growth and Metal Uptake. *Journal of Environmental Quality*. 33:458-464. http://jeq.scijournals.org/cgi/content/abstract/33/2/458

Deluhery, J. and N. Rajagopalan. "A Turbidimetric Method for the Rapid Evaluation of MWF Emulsion Stability." Accepted for publication in *Colloids and Surfaces A: Physicochemical Engineering Aspects*, 256: 18-28.

Ellis, A.; Deluhery, J.; Rajagopalan, N. "Effects of Organic and Metal Contamination on Etch Rate of Acid Baths -- Implications for Extended Acid Use." *Plating and Surface Finishing*, accepted.

Gilmer, J.; Eppert, J.J.; Rajagopalan, N. (2005) "Formulation & Testing of a Microfiltration Compatible Synthetic Metalworking Fluid." *Journal of Membrane Science* 256, 18-28.

Greeley, M. and N. Rajagopalan. (2004). "Impact of Environmental Contaminants on Machining Properties of Metalworking Fluids." *Tribology International* 37, 327-332.

Marlin, J.C. and R.G. Darmody (2005) "Investigation of the Excavation, Transport and Beneficial Use of Illinois River Dredged Material." In Raymond Walton, ed. *World Water and Environmental Resources*

Congress 2005 (American Society of Civil Engineers), May 15-19, 2005, Anchorage, Alaska.

Marlin, John. C. (2004) "Long Distance Transport of Illinois River Dredged Material for Beneficial Use in Chicago." *Proceedings of the Western Dredging Association twenty-fourth Technical Conference and Thirty-Sixth Texas A&M Dredging Seminar*. July 6-9, 2004. pp. 177-186.

Marlin, J.C. and R.G. Darmody (2005) "Returning the Soil to the Land, The Mud to Parks Project." *The Illinois Steward* 14(1), 11-18.

Mennitti, A.; Rajagopalan, N.; Kramer, T.; Clark, M. (2005) "An Evaluation of the Colloidal Stability of Metal Working Fluid." *Journal of Colloid and Interface Science* 284, 477-488.

Rajagopalan, N.; Rusk, T.; Dianovsky, M. (2004). "Purification of Semi-synthetic Metalworking Fluids by Microfiltration." *Tribology and Lubrication Technology* 60(8), 38-44.

Scott, J.W.; Curry, B.B.; Grimm, E.C.; Nelson, D.M.; Slate, J.; Greenberg, S. "Contrasting Hydrological Response to Holocene Climate at Nelson Lake and Crystal Lake, Northeastern Illinois." In American Quaternary Association. *Program and Abstracts of the 18th Biennial Meeting, Lawrence Kansas, June 26-28, 2004*. Lawrence, KS : Kansas Geological Survey. pp. 110-112, 2004.

Talbott, J.; Holm, T.; Kelly, W.; Wilson, S.; Roadcap, G.; Scott, J. ***Arsenic Geochemistry and Distribution in the Mahomet Aquifer, Illinois***. Champaign, IL: Illinois Waste Management and Research Center, 2004. (WMRC report number RR-107)

Talbott, J.; Holm, T.; Kelly, W.; Wilson, S.; Roadcap, G.; Scott, J.; "Arsenic Speciation and Distribution in the Mahomet and Glasford Aquifers, Illinois." In O'Day, P. A., Vlassopoulos, D., Meng, X. G., and Benning, L. G., eds. *Advances in Arsenic Research: Integration of Experimental and Observational Studies and Implications for Mitigation*. Washington D.C., American Chemical Society. ACS Symposium Series 915. pp. 148-160, 2005.

Talbott, J.L.; Stone, M.E.; Kuehne, J.C.; Cohen, M.E.; Scott, J.W. Effect of Iodine on Mercury Concentrations in Dental-unit Wastewater, *Dental Materials*, in press, 2005.

Talbott J.L., Mello JWV de, Roy WR, Stucki JW. "Mineralogy and Arsenic Mobility in Arsenic-rich Brazilian Soils and Sediments.", *J Soils & Sediments*, Accepted, 2005, OnlineFirst

Wentz, J.; Kapoor, S.G.; DeVor, R.E.; Rajagopalan, N. "Experimental Investigation of Membrane Fouling Due to Microfiltration of Semi-synthetic Metalworking Fluids." *Transactions of the North American Manufacturing Research Conference Proceedings*, May 23-27, 2005.

Presentations

Barnes, K. "EMS Implementation Workshop." Presented to Rocknel Fasteners (27-28 July, 24 August 2004), the staff of the Cities of Moline and Rock Island (8 June 2005) and the Illinois Department of Military Affairs (multiple dates).

Barnes, K. "EMS Overview." Presented to DNR management (8 July 2004), the management of the Cities of Moline and Rock Island (27 October 2004), and the management of HOBI International (28 June 2005).

Barnes, K. "Membrane Filtration Project Results." Presented to Mattoon Precision Manufacturing (15 July 2005)

Barnes, K. "Project Results." Presented to Nestle USA (1 February 2005).

Barnes, L.L. "Environmental Storytime" series (Dr. Howard Elementary School, Champaign, IL, weekly January-May 2005)

Brown, J. "Pollution Prevention." Presented at the Department of Commerce and Economic Opportunity Electroplater's Workshop. (Wright College, Chicago IL, 1 September 2004)

Brown, J. "Achievement, Engineering, and Pollution Prevention." Presented at MacArthur Middle School's Career Day (Berkeley IL, March 2005).

Knepp, C. "Green Chemistry and an Introduction to the Greening Schools." (12 workshops for teachers at multiple locations, on multiple dates)

Knepp, C. "Greening Schools Resources." Presented at the Chicago Health in Arts Workshop (Chicago IL, 20 April 2005).

Knepp, C. "Introduction to Green Chemistry and Greening Schools." Presented at the Illinois Science Teachers Annual Conference (Bloomington IL, 16 July 2004).

Knepp, C. "Introduction to Greening Schools." Presented to Tri-County Matters (Peoria IL, 13 August 2004), Anita Purves Nature Center's Teacher Resource Day (Urbana IL, 10 September 2004), and at the Illinois Counties Solid Waste Management Association Annual Conference (Bloomingdale IL, 15 October 2004).

Knepp, C. "Introduction to Greening Schools Resources." Presented to the Centers of Regional Environmental Education (CORE) (Sugar Grove IL, 20 August 2004).

Knepp, C. "The 3 R's, Garbage Monster." Presented to 2nd grade students at B.T. Washington Elementary School (Champaign IL, 3 February 2005).

Knepp, C. "What Color is Your Waste?" Presented to 5th grade students at Judith Giacoma School (Westville IL, 18 May 2005).

Knepp, C. "What is Greening Schools?" Presented to Solid Waste Agency Representatives (Chicago IL, 1 October 2004) and at the Parkland College Biofuels Workshop (Champaign IL, 17 February 2005).

Marlin, J. "Sediment handling and Beneficial Use as Topsoil." Presented at the Champaign County Hydraulic Engineering Luncheon (Champaign IL, 20 January 2005).

Marlin, J. and R. Darmody. "Mud to Parks: Returning the Soil to the Land." Presented at the Illinois Association of County Board Members Partners in Planning Conference (29 October 2004).

Marlin, J. and R. Darmody. "Potential Use of Illinois River Sediment as Topsoil at Brownfields and Other Sites." Presented to the University of Illinois at Urbana-Champaign Department of Natural Resources and Environmental Sciences (Urbana IL, 3 September 2004), to a class at the University of Illinois Urbana-Champaign College of Veterinary Medicine (Urbana IL, 10 September 2004), and at the Water 2004 Conference (University of Illinois at Urbana-Champaign, Urbana IL, 14 October 2004),

Piwoni, M. "Calumet Background Contaminant Concentrations." Presented at the Calumet Intergovernmental Working Group quarterly meeting (Chicago IL, 22 March 2005).

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WMRC 2005 ANNUAL REPORT

Research

Research…it's our middle name

WMRC supports research into waste management issues that impact the State of Illinois' environment and economy. Information emanating from these research projects enhances the understanding of the impact of waste and provides a basis for addressing these impacts. Other projects examine Illinois industries and look for creative methods and technologies to improve the way business is conducted. WMRC's research projects focus on pollution prevention technologies, ecological risk, contaminated sediment, remediation of contaminated DNR lands, and assessing the sources and risks of persistent organic pollutants in Illinois. WMRC is committed to funding high quality scientific research that encourages efficiency and economic viability in industry, provides Illinois' industrial and environmental scientists with project support, and positively impacts the State's environmental problems.

The following research projects were completed in fiscal year 2005:

Black-crowned Night Herons as Indicators of Ecological Risk in the Calumet Region, Chicago – Jeff Levengood and colleagues at the Illinois Natural History Survey have spent several years examining the viability of this state-endangered heron population. In collaboration with WMRC's laboratory program, the team has collected hundreds of samples of forage fish and crayfish, heron embryo tissues, and young heron regurgitates from nestling herons in an attempt to characterize the exposure of this colony to environmental contamination. Team members have observed the foraging habits of the birds, and have also measured effects on population dynamics. They have quantified levels of several biochemical indicators in the herons that are measures of the metabolic stress the birds are experiencing from contaminant exposure. Calumet area birds, compared to populations in Minnesota and Virginia, show elevated concentrations of organic contaminants and of associated biochemical indicators, suggesting that the colony is under some exposure stress. This study will be a keystone of the ongoing assessment of ecological risk being conducted by the Chicago Department of Environment and collaborating partners.

Peoria Lake Sediment as an Agricultural Soil Amendment – This project is being coordinated by Robert Darmody, scientist in the Department of Natural Resources and Environmental Sciences at the University of Illinois, Urbana-Champaign. Darmody and his students have been exploring the potential of Peoria Lake sediments to serve as a soil amendment in poor agricultural soils. By blending sediments at different proportions with sandy western Illinois soils in standard field plots, they have been able to measure the impact of the sediments on the growth of corn and

soybeans. Siltation/sedimentation is a huge problem in the Illinois River, impacting transportation, commerce, recreation and wildlife. Selective dredging in the river holds promise for improving all of these uses, but suitable placement regimens are required. Dr. Darmody's work has shown that river sediments can improve the water holding capacity, and hence the productivity, of marginal agricultural soils in the river basin.

Municipal Wastewater Reuse in the Chicago Area – Dr. Paul Anderson and his students at the Illinois Institute of Technology (IIT) have completed a study of the potential for reuse of municipal wastewater in the Chicago area. Water supply is an issue of increasing concern for northeastern Illinois as population and water demand growth continue in the region. Reuse of wastewaters for non-consumptive applications in industry and for landscape irrigation could ease demand on increasingly limited water supplies. Regulatory issues, existing institutional or policy programs, potential human health risks, technical requirements, and economic issues were explored in this research. Preliminary results from the study played an important role in securing a grant from the US EPA to develop a decision model for wastewater reuse in an urban setting. IIT, WMRC, and the Northeastern Illinois Planning Commission will be collaborating on this project over the next two years.

The Hydrologic Footprint of Industry – WMRC provided partial sabbatical support to Dr. Paul Anderson at the Illinois Institute of Technology for this project. Anderson explored a method for measuring the role of industry in the hydrological cycle by estimating an industrial hydrologic footprint. This study examined direct water use associated with industrial activity, indirect water use associated with electricity, storm water runoff, and indirect water use associated with the supply chain for an industry. The pollution prevention staff at WMRC has determined that few of the industrial facilities where they have worked over the years have a good concept of total water usage within those facilities. Before significant steps can be taken in the direction of industrial water conservation, the understanding of water use within industrial facilities must improve. Anderson's project hopes to begin to close that knowledge gap through the research done at a large facility in Aurora, IL.

Restoring the Illinois River – Keith Carr at the Illinois Geological Survey has been investigating the role of a 1600-acre floodplain and backwater lake site in trapping suspended sediment from the Illinois and La Moine Rivers near La Grange. Restoring floodplains and backwater lakes is a proposition often hindered by numerous unknown factors, especially in highly altered basins such as the Illinois River. In order to make the best management decisions for the river, backwater lakes, and wetlands, it is essential to understand sedimentation patterns in formerly leveed sites that are newly opened to the river. The study site represents an ideal outdoor laboratory, strategically located in a reach of the Illinois River area noted both for excessive sediment load and for high flood stages due to a floodplain constricted by levees.

This seed-level project explored the sedimentation history for this site, from the period prior to settlement through the time of rapid change, to the current and ongoing site sedimentation regime. The researchers conducted a morphological examination of the sediments, coupled with radiometric dating techniques, to construct the past chronology. The study also initiated a program whereby current and ongoing sedimentation rates on the parcel are measured. The aim is to predict the role that this site could have in removing sediment from the Illinois River, as well as to quantify the effects that ongoing sedimentation may have on the condition of the backwater lake and on the overall ecology of wetlands

in the site.

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WMRC 2005 ANNUAL REPORT

Technical Assistance

Whenever you want to "throw something away," remember that there really is no "away." No matter where you dispose of an item, it is going to have some impact on the environment.

Have you ever stopped to think about what happens to the waste oil, anti-freeze, paint, solvent, pesticide and the like, that is poured down a drain or runs into a curb drain? Well, it ends up in the city's municipal wastewater treatment plant to be treated prior to being discharged into a nearby river or lake.

The problem is, of course, much larger for industry. Each year billions of pounds of waste are generated in the United States. It makes good business sense to improve the processes and practices that contribute to wastefulness. WMRC can provide environmentally responsible cost containment and quality improvement ideas, and assist with implementation. WMRC experts can help businesses and organizations reduce all types of solid waste as well as toxic releases into the air or water.

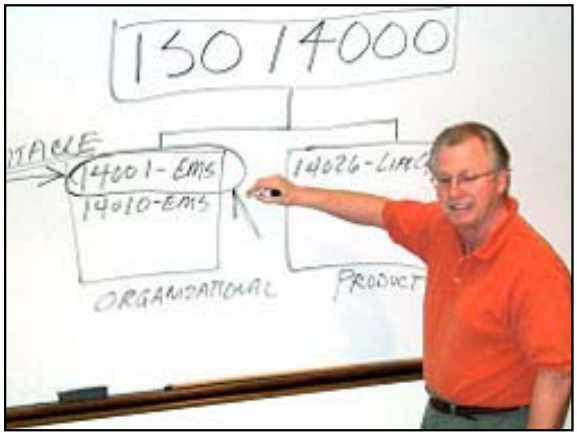
WMRC's services typically begin with a free assessment to develop strategies and set priorities for addressing issues. WMRC staff assists companies to develop and implement processes that are more environmentally friendly and less wasteful. Services can include pollution prevention, energy efficiency, water purification and conservation, and testing of alternative technologies. No matter the size of the project, WMRC can provide a sustainable solution! Some recent highlight project include:

Energy efficiency and pollution prevention
WMRC worked this year with the Koppers plant in Stickney, IL to identify and implement opportunities that simultaneously reduced operation costs, waste generation, and emissions. Koppers produces chemicals, carbon compounds, and treated wood products. During the process, 11 pollution prevention opportunities were identified, evaluated and prioritized. Koppers determined its highest priority item and implemented it in March 2005. The company was able to monitor the compressed air feed to its phthalic anhydride reactors and reduce the airflow during low production periods. The compressed air project has resulted in a reduction of phthalic anhydride emissions by an estimated 1,400 per year. This also will mean a reduction of energy consumption of 4,200-kilowatt hours per year, and an annual savings of $263,000 for Koppers.

Municipal environmental management

Managing the environmental issues of a large municipality isn't easy. Issues such as the use of large fleets of vehicles, numerous construction projects, and a cornucopia of environmental inputs of citizens, businesses, manufacturers and industries can all add up to an environmental "sticky-wicket." Establishing an Environmental Management System (EMS) aligned with the International Environmental Standard - ISO 14001 - creates the framework to efficiently and

effectively address and manage a city's environmental aspects. In 2005, the Illinois cities of Rock Island and Moline, with the help of WMRC, took the first steps to establish a management system to help control their environmental affairs. Both of the cities established an Environmental Policy; then identified the environmental aspects of their departments; established goals, targets and programs; and created a system for preventive and corrective action of any outstanding environmental issues. The cities' plans were structured to provide the most efficient method to identify and manage environmental issues ranging from citizen complaints to water and electrical usage. The cities no only will save money but may also provide citizens a greater piece of mind knowing that Rock Island and Moline are not pollution sources to the great Mississippi River.



A safer cleaner

Dynamic Manufacturing, Inc. in Melrose Park is a family-owned and operated transmission remanufacturing business. Dynamic currently operates at nine locations. In the past year, the company turned to WMRC to find a way to improve its organic solvent cleaner systems. WMRC hooked the company up with a water-based (aqueous) parts washing system to replace the system that used harsh chemicals. The aqueous cleaner eliminates the odor of the old system, operates at lower temperatures, and is not a fire or explosion risk. This system also reduces Volatile Organic Compounds (VOC), reduces chemical and maintenance costs, and improves employee morale and working conditions. The total amount of organic solvent eliminated by using ten aqueous cleaners is estimated at some 198,000 pounds per year. The associated cost savings of using the safer parts washers is estimated to be more than $50,000 per year.

Cleaning up wastewater

WMRC this year helped the Nestle USA Corporation to reduce the amount of waste it discharges to the local sanitary sewer. The Jacksonville Nestle plant was discharging over three million gallons of wastewater with excess CoffeeMateâ at an annual cost of over $190,000.00. Through a pilot project funded by the Nestle USA Corporation, several technologies were investigated to determine if the CoffeeMate could be removed from the wastewater and used as a secondary feed source for livestock. Using an industrial filter press in combination with a microfiltration system provided the greatest return for Nestle. The equipment not only removed the excess CoffeeMate in a dry solid form but also lowered the Biological Oxygen Demand (BOD) of Nestlé's waste stream by 82 percent. Nestle is currently considering the various options for implementation that WMRC has provided to them.

It's Raining Computers and Cell Phones

Computers and Cell Phones are everywhere - the disposal of old and used electronic equipment is at an epic proportion. They're literally everywhere! HOBI International of Batavia is trying to improve this situation by collecting old and used electric equipment and refurbishing it to like new condition. The refurbished equipment is then sold to international markets through the IBM, Motorola, and Nokia companies. HOBI wanted to show that it practiced what it preached -- environmental responsibility. The company turned to WMRC to develop a certified ISO 14001 Environmental Management System (EMS). In the past year, HOBI developed an environmental policy and identified its environmental aspects. HOBI is currently completing the framework to implement an environmental system to help reduce its environmental footprint.

Green Construction and Development
The WMRC Pollution Prevention Program has developed a new assistance program to help residential and industrial developers and construction companies in Illinois learn about Green Construction and Design, energy and waste management, and recycling and reuse of construction materials. WMRC engineer Ken Barnes has developed a program that addresses WMRC's role as a "resource for environmentally sustainable construction and development." The program's goal is to provide knowledge on green concepts and principles, promote construction best management practices, and form partnerships with builders, architects, and planners. WMRC also wants to help Illinois manufacturers by providing opportunities for pollution prevention and energy efficiency in building materials such as carpet, paint, and baseboards.

Biodiesel from waste
WMRC will make a big effort in the upcoming year to explore making biodiesel from waste products. Plans are to use waste oils to make a 100% biodiesel fuel to power the WMRC diesel truck. The project will be expanded to include school buses and other uses.

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Waste Management and Research Center
Illinois Department of Natural Resources
One Hazelwood Dr.
Champaign, IL 61820
T: (217) 333-8940
F: (217) 333-8944

WMRC 2005 ANNUAL REPORT

WMRC Staff

It's our people that make WMRC special!

WMRC staff as of 11-01-05

Administrative Services
George Vander Velde, Director
Gary Miller, Assistant Director
John Marlin, Senior Scientist
Kate Day, Manager, HR & Finance
Jeri Knaus
Tenna Knox
Cindy Melchi
Margaret Morrison
JoAnne Porter

Research & Laboratory Services Program
Marv Piwoni, Manager
Gary Bordson
Teresa Chow
Yakov Lazovsky
Chris Rohl
John Scott
Jonathan Talbott
Luann Wiedenmann
Monte Wilcoxon

Technical Assistance Program
Tim Lindsey, Manager
Ken Barnes
Malcolm Boyle
Jerry Brown
Georgene Frego
Dan Marsch
Joe Pickowitz
Kishore Rajagopalan
Riyaz Shipchandler
Mike Springman
Mike Thinnes
Jim Janssen
Rob Guennewig

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Randy Wahlfeldt, Systems Administrator
Ed Delso

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Bob Iverson, Manager
Laura Barnes
Wayne Duke
Debra Jacobson
Carol Knepp
George Krumins
Tyler Rubach
Joy Scrogum

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Research Funding | Information Services | Technical Assistance | Laboratory Services

The Waste Management and Research Center (WMRC), a division of the Illinois Department of Natural Resources, assists Illinois industries, businesses, and citizens to reduce and manage waste. WMRC services include:

- Laboratory Services
- Information Services
- Research Funding
- Technical Assistance

Through WMRC's efforts, Illinois Businesses can become more efficient and competitive. Improving the economic climate while protecting natural resources makes Illinois a better place to live.

NEWS

1.2.08 EPA Widens Window on Regulatory Process
1.2.08 Eyes: Windows to the World
1.2.08 Low Dose Arsenic Is an Endrocrine Disruptor

More News...

SPECIAL PROJECTS

- ADOP2T
- Biodiesel
- Chicago P2 Alliance
- Green Development and Construction Program
- Greening Schools Project
- IL DoD Environmental Partnership
- Illinois Governor's Pollution Prevention Awards
- Illinois River Project
- WMRC Seminar Series on Sustainability

SITE HIGHLIGHTS

WMRC announces the 2007 Illinois Governor's Pollution Prevention Award Winners.

WMRC's 2007 Annual Report is now available!

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Illinois Department
of Natural Resources

Illinois Department of Natural Resources

www.dnr.state.il.us

Rod R. Blagojevich, Governor

DNR Links

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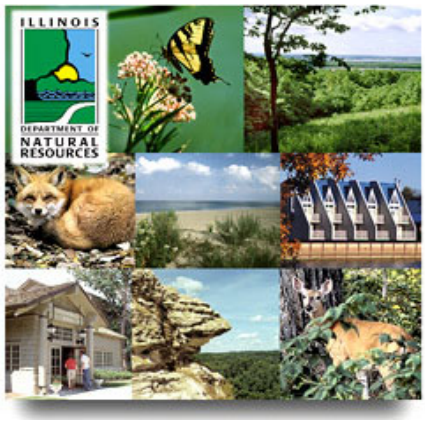

Welcome to the Illinois Department of Natural Resources Website

Our mission is to manage, protect and sustain Illinois' natural and cultural resources; provide resource-compatible recreational opportunities and to promote natural resource-related issues for the public's safety and education.

By exploring our website, you will learn about how you can enjoy the natural wonders of our state, purchase a fishing or hunting license, tour our state parks or link to exhibits at the state museum. Enjoy all that outdoor Illinois has to offer!

What's New

- 12/07/07 Conservation Stewardship Program (SB17) Information and Application available here
- 11/27/07 Deer Hunters - Check the Chronic Wasting Disease Test Results for your deer here
- 1/01/07 - Deer Hunters: New Regulations & Hours: read our Press Release or check out the updated Administrative Rule here
- 11/01/07 - IL Sportsmen Against Hunger
- Commercial License Holders
- Hunters: Check in your Turkey or Deer - Harvest Pin Information and Harvest Check Station & Reporting

Facts & Information

- Press Releases
- Administrative Rules
- Announcements & Events ~ Calendar
- Forestry - Land Assistance Program
- Flood Map Modernization Program
- IL Wildlife Action Plan
- Chronic Wasting Disease & Info
- Strategic Plan for IDNR
- Director's Corner

January 2, 2008

DNR Features

State Features